Galileo's Near Infrared Mapping Spectrometer (NIMS) Science Predictions for Io

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The Galileo spacecraft arrives at Jupiter on December 7, 1995. Amongst Galileo's four remote sensing instruments is NIMS, which combines imaging and spectral capabilities, covering the wavelength range 0.7 to 5.2 microns. NIMS will be used to map the composition and temperature of Io's surface materials, hot spots, and plumes, and to search for selected atmospheric species.

During Galileo's closest approach to Io NIMS will obtain two global compositional maps of the hemisphere centered on Prometheus. These will. be followed by local maps of selected surface features, and by three atmospheric limb scans. After closest approach, NIMS will image Io's nightside in the vicinity of the hot spots Kanehekili and Loki. We expect our data to reveal the temperature distribution of Io's surface and hot spots (down to 180 K) on both global (25 to 60 km resolution) and local (< 10 km resolution) scales. We expect to detect high temperature silicate volcanism using the instrument's shorter wavelenghts. NIMS will be able to distinguish between silicate and sulfur volcanism on the basis of temperature and, in collaboration with Galileo's Solid State Imager, on the basis of spectral data. We expect to detect haloes of SO_2 around active plumes, increased concentrations of SO_2 away from the subsolar point, and SO_2 in the atmosphere, above the limit of NIMS detectability (10^{17} molecules cm-2).

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5. (a) P03: Jupiter System Predictions
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7. 25% at AAS Division for Planetary Sciences Meeting, Kona, October 1995.

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